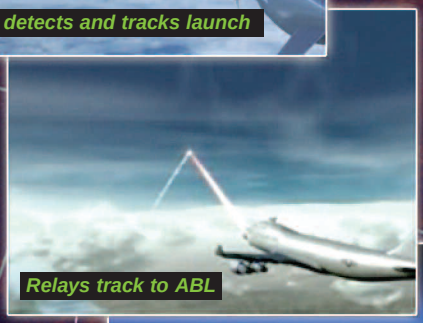
WSTIAC

Weapon Systems Technology Information Analysis Center

Ground-based launch detected


HAA detects and tracks launch


Relays track to ABL


HAA tracks second missile

High Altitude Airship: Leading the Way for Stratospheric Defense Systems

6 Course Training Program on Systems Engineering

Ground-based interceptor launched


Mission success

WSTIAC Quarterly
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14. ABSTRACT
This issue of the WSTIAC Quarterly features an article on the High Altitude Airship. Also included are recent news items related to weapon systems technology, the WSTIAC Calendar of Events and an introduction to the new WSTIAC Director. Details on several Training Courses sponsored by WSTIAC are also included in this issue. Contents of in the News: Beale Global Hawk Deploys For First Time, Essex Demonstrates Sustained Mission Readiness, and Gates Urges Faster Production of Mine Resistant Ambush Protected Vehicles.

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Welcome to the fall edition of the *WSTIAC Quarterly*. With the publication of this issue, I have the unique opportunity and honor to make a very important introduction. This issue marks the beginning of a new era, as we announce Mr. Mark Rider as the new Director of WSTIAC.

Mr. Rider joins WSTIAC after a distinguished twenty-six year career of military service. Before retiring as a Colonel from the US Army, he spent the bulk of his career working on acquisition, procurement, and test and evaluation programs. Seventeen years of his service were dedicated to supporting the acquisition community on everything from ACAT 1D to ACAT III weapons programs, executing weapon systems program management for several Army facilities. Mr. Rider has served as an Army project manager for direct fire ammunition at Picatinny Arsenal in New Jersey, product manager for a smart munition and missile system at Redstone Arsenal in Alabama, project director for indirect fire training and simulation systems in Orlando, Florida, operational evaluator for fire support systems in Alexandria, Virginia, and Department of the Army systems coordinator for several weapon systems in the Pentagon. His extensive involvement with a variety of weapon systems will prove to be invaluable in leading the efforts of our weapon systems technology experts to better support the warfighter.

As a result of his dedicated efforts, Mr. Rider has been honored with numerous commendations and awards for outstanding leadership and performance. These include the Fiscal Year 2006 Secretary of the Army Project Manager of the Year and selection of his office for the 2005 Department of Defense David Packard Award for Program Management.

In future editions of the *WSTIAC Quarterly*, Mr. Rider will introduce the issue with a message to the readers as he has for this issue. In the meantime, I encourage all of you to welcome Mr. Rider to his new position.

Ben Craig
Editor

Director's Corner

A MESSAGE FROM MARK RIDER, WSTIAC DIRECTOR

As I take on this new role as the WSTIAC Director, I plan to leverage all of my past experience to ensure that this publication and WSTIAC are better suited to support you, our customers, well into the future. In mentioning "our customers", I'm referring to several communities, including:

- Requirements Developers/Combatant Commands
- Materiel Developers (Project Managers and Procurement Officials)
- Engineers and Scientists

I will be focusing my efforts on meeting your weapon systems technology needs by partnering with the appropriate subject matter experts and all others involved to shape WSTIAC in such a way that we can more effectively and efficiently assist you in delivering information and expertise when and where you need it. This will entail promoting all of WSTIAC's extensive capabilities and highlighting those key technological areas that are aligned with your needs and areas of interest.

With that said, I believe that you will find the feature article about the High Altitude Airship to be particularly interesting. The authors provide a concise discussion of critical areas concerning the High Altitude Airship from the initial requirement to the materiel solution. The overall engineering approach for the High Altitude Airship is presented, including the system design and risk reduction aspects, and the article contains a concluding section that presents the Airship's mission enablers. Certainly, the High Altitude Airship is a fascinating acquisition program that will provide great benefit to our nation. I hope that you find the article and the rest of the journal useful in contributing to your efforts of supporting our warfighters.

Regards,
Mark Rider
WSTIAC Director

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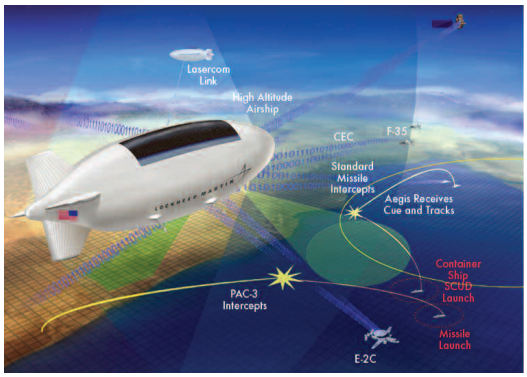
High Altitude Airship: Leading the Way for Stratospheric Defense Systems

Mark Gibbs
Charles Wasson
Lockheed Martin
Akron, OH

The Need for Persistence: "Persistent airborne Intelligence, Surveillance and Reconnaissance (ISR) is a critical supporting element to USSOCOM's prosecution of the Global War on Terror. ISR must not only be ever present, but must rapidly disseminate operational information to key elements on the battlefield." *Gen Bryan D. Brown, U.S. Army Commander, U.S. Special Operations Command, before The House Armed Services Committee Subcommittee on Terrorism, Unconventional Threats and Capabilities on the Current Manning, Equipping, and Readiness Challenges Facing Special Operations Forces, 31 January 2007*

"Our goal is an efficient global ISR enterprise, focused on achieving persistent collection capabilities against legacy and emerging threats through enhanced global sensor management of U.S. and coalition capabilities." *Gen James E. Cartwright, Commander U.S. Strategic Command, before the Strategic Forces Subcommittee, Senate Armed Services Committee on U.S. Strategic Command, 28 March 2007*



As the nature of modern tactical and strategic warfare evolves, the use of the atmospheric region known as "High Altitude" for persistent surveillance and communications has become of vital importance. The High Altitude Airship System truly redefines the word persistence as coverage moves to the realm of weeks/months and not just hours. This unique aerial platform will be the first truly persistent platform usable at high altitude, with near zero ground speed (geostationary). It provides an ideal environment to support communications connectivity, tactical C4ISR (Command, Control, Communications, Computer, Intelligence, Surveillance and Reconnaissance) and long-term/staring mode Moving Target Indicator (MTI) surveillance.

HIGH ALTITUDE AIRSHIP: AN INNOVATIVE SOLUTION TO A CHALLENGING PROBLEM

The High Altitude Airship is an unmanned, helium-filled, non-rigid airship designed to operate in the stratosphere above 60,000 ft altitude for months at a time. The High Altitude Airship System is being developed by a Lockheed Martin-led team for the Missile Defense Agency (MDA) under FY 2007 funding. Key objectives of the current Phase 3 of the program are: (1) to demonstrate the feasibility of high-altitude lighter-than-air (LTA) flight by building and flight testing a High Altitude Airship Prototype System; and (2) to advance technologies that will enable the production of a more capable High Altitude Airship Operational System. To achieve these goals, the program team has engineered innovative technologies and solutions in the area of high strength-to-weight materials, advanced power systems, propulsion, and lighter-than-air vehicle specific subsystems. Operational experience gained from the prototype airship combined with improved and expanded subsystem technologies will provide a solid foundation for the future operational vehicles.

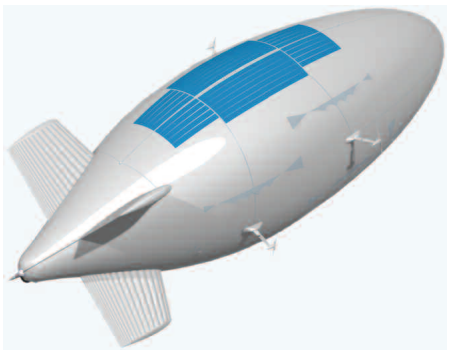


Figure 1. High Altitude Airship Prototype Vehicle.

OVERVIEW OF THE HIGH ALTITUDE AIRSHIP VEHICLE

The prototype airship, as seen in Figure 1, has an approximate hull volume of 3.7 million cubic feet. It is a non-rigid vehicle and its hull is made of a high strength-to-weight composite laminate (fabric). The pressurized fins configured in an x-tail arrangement are also made of a laminate. The all-electric solar-based regenerative power system is based on thin-film solar arrays and rechargeable batteries. The High Altitude Airship team brings together a variety of industry expertise to deliver the following technologies and major subsystems:

- Hull and fins made of high strength-to-weight material capable of surviving the lower stratospheric environment
- Ultra-light helium cells
- Low-weight, high-efficiency, state-of-the-art photovoltaic arrays
- High specific energy battery storage
- Environmentally controlled equipment bay
- Pressurization system (helium and air valves, blowers)
- Lower modular payload bay design (with an upper payload attachment provision)
- Hull-mounted, highly efficient electric propulsors
- Redundant Vehicle Management System/ C2 System

SUCCESSFULLY MOVING TOWARDS FIRST FLIGHT

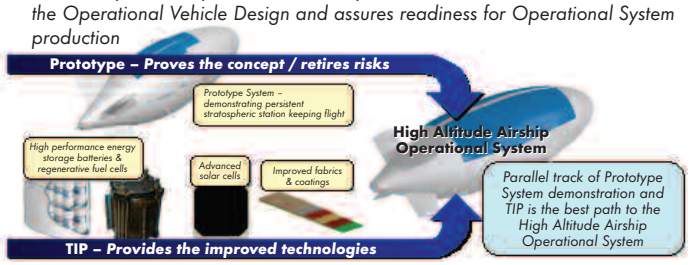
The High Altitude Airship program was initiated in 2003 with a series of Technical Interchange Meetings (TIMs) that resulted in the selection of teams led by Lockheed Martin, Boeing, and WorldWide Aeros to participate in a

concept definition phase (Phase 1). This phase culminated in a Preliminary Design Review and proposals for a design and risk reduction phase (Phase 2). The Lockheed Martin team was the sole team selected by MDA to move forward to Phase 2. The design was matured and numerous risk-reduction activities were completed during Phase 2, leading to a successful Critical Design Review in October 2004. The program then moved into a bridge phase, which consisted of a series of technical reviews and planning activities to assess the best path forward for the program. In December 2005, MDA awarded Lockheed Martin a contract to begin activities toward the finalization of the design, build and test of the High Altitude Airship Prototype System (Phase 3).

During the current phase (Phase 3) the Lockheed Martin team is refining design details and specifications, and is developing the associated production processes for the Prototype Vehicle. In parallel with the Prototype Vehicle, the team will perform activities for a Technology Improvement Project (TIP). The TIP activities will take current identified technologies and help mature their design state along an achievable path so that they are available in time for the production of future High Altitude Airship Operational Systems.

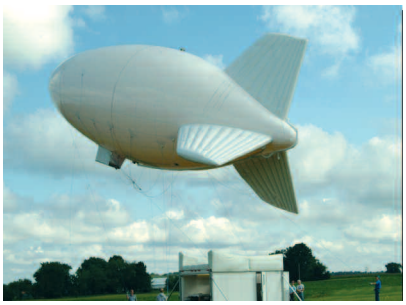
Technical Approach to the High Altitude Airship Operational System

- Prototype System: *Will demonstrate technical feasibility and military utility of high altitude airships with available technologies; retire integration and flight test risks for Operational System; provide a testbed*
- Technology Improvement Project (TIP): *Will transition critical technologies from their present-day state to a maturity level that enhances confidence in the Operational Vehicle Design and assures readiness for Operational System production*



A RIGOROUS SYSTEM DESIGN AND RISK REDUCTION STRATEGY

From the onset of the program, high priority has been given to identifying a system design that meets the program objectives while minimizing risks to the program. Strategies used include rigorous system and detail level trade studies, which have led, for example, to the optimum shaped aerodynamic vehicle; a disciplined weight management strategy that allocates and tracks system/subsystem weight budgets to help maintain adequate margin to meet the program goals; and detailed analysis and testing of both subsystems and lower level elements such as the meticulous thermal studies performed at the vehicle system level, or those associated with selecting the optimal coatings for the fabric.

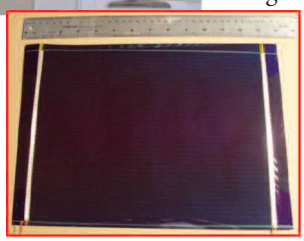


To help validate these designs and reduce risk, activities in these earlier phases included the fabrication of a high-efficiency propulsion motor and controller; high-altitude pressurization subsystem blower, check valve and air valve; equipment bay; power system battery, photovoltaic and control electronics Engineering Development Units (EDUs); Vehicle Management System (VMS) breadboard and VMS fiberboard converter; Vehicle Command and Control (VC2) demonstrations; System Integration Laboratory (SIL) and pilot training station development; extensive fabric development and testing; inflated fabric structure pathfinders (a 12,000 cubic ft aerostat and helium cell demonstrator), wind tunnel testing, and high-altitude balloon testing. Also during this phase, Lockheed Martin made significant progress in system-level and subsystem-level design, development, and testing, demonstrating the maturity of the selected technologies for the prototype High Altitude Airship system.

A key enabling technology for LTA flight at high altitudes is in the area of specialized fabric laminates. The High Altitude Airship fabrics provide the structural properties required to maintain the airship's shape during all phases of flight under all conditions, including the expected severe thermal environment at high altitudes. The outer layers of the fabrics are specially designed to protect the strength members of the fabric from the environment and to minimize the temperature variations of the lifting gases inside the airship envelope. Multiple fabrics were produced, tested and iterated to optimize the final design. Thousands of yarn, strip, and cylinder tests have been performed to quantify the performance of the high strength-to-weight composite fabrics that are necessary for the High Altitude Airship envelope. The thorough quantification of the fabric properties for the intended application allowed the Lockheed Martin team to design the airship using fabrics that can be manufactured with today's low-risk, commercially available material. Initial pre-production quantities of the final fabrics have been tested and have

exceeded strength-to-weight requirements.

The key to the persistent flight of the High Altitude Airship vehicle is a solar-regenerative power system. Since it would be impractical to take sufficient fuel to power the airship for more than a few days, the High Altitude Airship power system harvests energy from its environment above the clouds with a state-of-the-art flexible thin-film solar array. This solar array provides power during daylight for propulsion, payloads, and airship controls and communications, as well as for recharging a battery for nighttime power. At night, the high specific energy lithium-ion battery system provides power for the airship. The battery is based on the latest developments in rechargeable batteries, being driven by the market for lightweight batteries for laptops and cell phones. The overall High Altitude Airship solar regenerative power system parallels the power architecture used on many spacecraft built by Lockheed Martin, leveraging lessons-learned on building and flying high reliability space power systems. The selected key elements of the regenerative power system for the High Altitude Airship Prototype Vehicle, the solar cells and batteries, have already been tested extensively under representative conditions and have exceeded their performance requirements. Risk reduction is now moving into the next stage of integrating these key elements with power control electronics into a ground test-bed that will demonstrate closed-loop operation and will help verify power system models.



The proposed High Altitude Airship Prototype System – being built with available and quantified technologies – will not only demonstrate the feasibility of high-altitude, long-endurance, LTA flight, but will also allow demonstration of a variety of payloads and mission capability, and will become the stepping stone toward the High Altitude Airship Operational System.

HIGH ALTITUDE AIRSHIP SYSTEMS ENGINEERING APPROACH

The High Altitude Airship Prototype System Design (PSD) System Engineering Approach is based on a robust, multi-disciplinary, System Engineering and Integration Team (SEIT) applying Lockheed Martin's standard System Engineering (SE) process. The SE process, which was developed from preferred practices and lessons learned, is *iteratively* and *recursively* applied to all system levels of abstraction and entities to translate the High Altitude Airship contract and Statement of Objectives requirements into a physical design solution that forms the prototype system and is traceable back to the source or originating requirements.

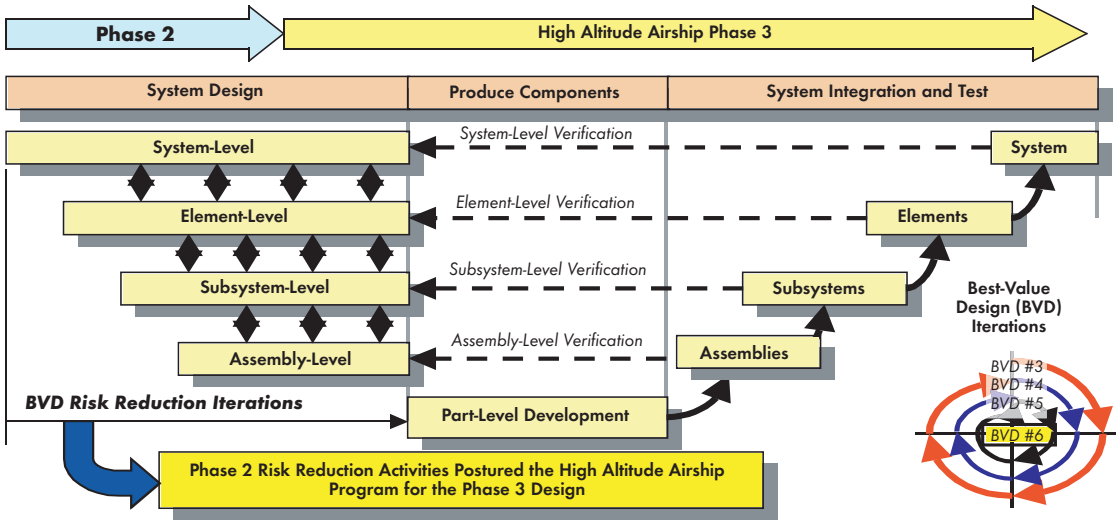


Figure 2. High Altitude Airship Multi-Disciplinary System Engineering Approach.

The Lockheed Martin SE process is based on the highly iterative, multi-level, V-Model for system design, development, and integration shown in Figure 2. Key characteristics of the "V" are:

- Left side – represents the evolving levels of detail design.
- Bottom – represents the procurement and development of components, assemblies, or subsystems.
- Right side – represents the multi-level system integration, test, and verification activities.

Leveraging subject matter expertise in LTA technologies, system development, and operations and support (O&S), the SEIT analyzed the High Altitude Airship contract and Statement of Objectives requirements. From these requirements, mission phase use cases were derived based on conceptual mission requirements and used as the basis for formulating system-level requirements.

Requirements analysis methods were employed to identify candidate High Altitude Airship system-level functional and physical architectures for the PSD solution. A simulation consisting of engineering performance models of various aspects of the PSD was developed to support performance requirements analysis and trades and validate the evolving PSD solution. A key supporting element of this approach is the System Integration Laboratory (SIL) Verification and Validation (V&V) Working Group that provides oversight and continuity to the engineering model requirements and V&V and subsequent transfer to the SIL real-time simulation for final V&V.

Once the High Altitude Airship System architecture for the PSD was selected, a series of Best Value Designs (BVDs) was published to document the key PSD Airship System features and operational characteristics. Other guidance documents include the High Altitude Airship *Description of System Operations (DESSOPS)* describing the operational concept description and the High Altitude Airship *System Level Description*, which includes engineering direction such as the High Altitude Airship standards of units, coordinate systems, reference designators, et al. Similar descriptions were developed for the Airship System, Flight Operations Center (FOC), Ground Support System (GSS), and Flight Test Instrumentation System (FTIS) elements.

The High Altitude Airship system architecture was decomposed into lower levels of complexity to achieve the PSD solution. The multi-level framework of this architectural decomposition serves as the basis for the High Altitude Airship Specification Tree. As each level of abstraction was decomposed into lower levels of abstraction and entity architectures, requirements for a given entity were captured as system, element, subsystem, and assembly level specifications; allocated to elements, subsystems, assemblies, or subassemblies within the architecture, and flowed down to the level specification. In general, allocations were made to the following classes of system functional architecture elements: personnel, equipment – e.g., hardware and software, procedural data, mission resources, and facilities, as applicable to the entity. As a result, specification requirements are traceable top-down/bottom-up to the source or originating requirements.

A model-driven design approach was also developed to understand and capture the details of the internal behavioral interactions between the FOC, Airship System, GSS, FTIS, and Airdock Facility and external interactions with the Federal Aviation Administration (FAA) Air Traffic Control Centers (ATCCs).

Allocation and traceability of requirements at all levels is accomplished using the Dynamic Object-Oriented Requirements System (DOORS) requirements management tool. Leveraging the Lockheed Martin Intranet web-based DOORS tool capabilities, and teleconferencing/meeting facilities; the High Altitude Airship Program created a virtual, collaborative engineering environment that enabled IPTs in various physical locations to accomplish work as though they were co-located.

When all detailed designs are completed, the respective components are procured and/or developed in accordance with their respective drawings, wiring diagrams, specifications, etc. When procured or developed components have been *verified* against their respective design requirements, subassemblies, assemblies, subsystems, and elements enter the right side of the "V" for system integration, test, and verification. These activities are accomplished using verification methods such as analysis, inspection/examination, demonstration and test, as called for in the test article's specification. Final system integration and test activities will culminate in a System Verification Review (SVR).

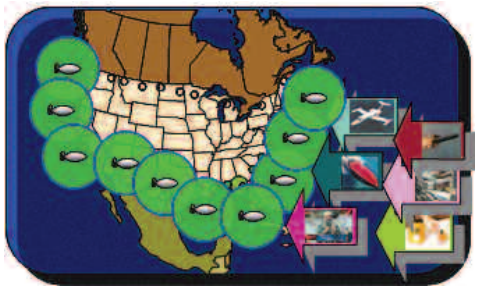
Across the "V," baselines are established at various control points to establish formal configuration control to ensure the integrity of the evolving PSD solution. As designs mature, approved and released versions of their associated following work products are placed under configuration control and subjected to formal change management by the High Altitude Airship Configuration Control Board:

- Specifications form the "As Specified" baseline
- Detailed design requirements – e.g. drawings, schematics, etc. - form the "As Designed" baseline
- Verified component designs form the "As Verified" baselines
- PSD and simulation technical data package (TDP) on completion of the flight tests form the basis for the "As Validated" baseline.

Since the High Altitude Airship System will ultimately require an FAA Certificate of Authorization to fly, preserving the integrity of the integrated SE process and its work products to pass the Flight Readiness Review (FRR) is critical to success of the PSD and the demonstration program and subsequent High Altitude Airship Objective System design.

MISSION CAPABILITY

Combining the high-altitude surveillance perspective with the capability to station-keep within nominal range and velocity limits and to remain on station for month-long (and later, year-long) deployments provides users with a unique capability for sensor and communications exploitation. The High Altitude Airship Vehicle provides an effective platform for a wide variety of potential mission payloads. High Altitude Airship unique near-space capabilities include:



- Large footprint (300-mile line-of-sight radius to horizon)
- Persistent coverage
- Opportunities for enhanced sensor performance (radar/optical)
- Low operating cost

- Improved track quality
- Rapid satellite capability reconstitution
- Survivable / Recoverable / Repairable / Re-taskable

The High Altitude Airship is a truly persistent, relocatable, multi-mission, multiple payload and reconfigurable payload platform. The system is re-taskable in flight and can be recovered and reconfigured as required to meet specific mission requirements. The High Altitude Airship will enable continuous (24/7) over-the-horizon communications, wide-area surveillance and protection to support theater operations without interruption, even in mountainous terrain. The High Altitude Airship system can enable target reconnaissance, intelligence, and target acquisition to support low-altitude air threat defense, cruise missile defense and missile defense missions.

The High Altitude Airship could also provide cueing and onboard weapons to defeat low-flying threats, maritime targets, inaccessible land-based targets and ballistic missiles. High Altitude Airship platforms employed along the U.S. border or elsewhere as contingency platforms could provide multifunction support to non-DoD agencies such as Department of Homeland Security (DHS), Federal Aviation Administration (FAA), Customs, Immigration and Naturalization Service and the Drug Enforcement Agency (DEA). Its unique performance characteristics and low operating costs can supplant the use of otherwise unaffordable combinations of other assets.

High Altitude Airship can support and/or enable the following missions:

MDA and Theater Support

- Optical/radar surveillance (horizontal/upward & downward viewing)
- Broadband data relay of beacon, sensor, laser communications, C2, and intelligence information to various level headquarter units
- Weapons (boost-phase ABL relay)
- Intelligence sensors
- Utility (MDA test-bed; flight test support; experimental use of new optical/radar subsystems, communication equipment, and Intel sensors; and test/evaluation of new airship subsystems for future system spiral upgrades)

Civil Applications

- Wireless telecommunication (receive/transmit, relay, range extension)
- FAA communication range-extension relay, transponder radar beacon adjunct
- Natural disaster response

Homeland Security

- National Cruise Missile Defense (CMD)
- Real-time multi-band persistent area surveillance (horizontal/downward viewing)
- Border patrol
- Counterterrorism operations
- Counter drug smuggling operations
- Communications linking and relay

Space Mission Areas

- Space Force Enhancement
  - C4, intelligence, surveillance, reconnaissance
  - Missile warning (optical, radar, IR surveillance)
  - Communications
  - Position / Navigation
  - Environmental monitoring (weather, moisture content, solar phenomena)
- Space Control
  - Surveillance of space
  - Space situational awareness
  - Deny, degrade, deceive, disrupt, & destroy
- Space Force Application – targeting and weapons

With its breadth of mission capabilities the High Altitude Airship System can enable new missions and become a complement to existing assets as it provides an affordable single-platform solution to the long persistence dilemma.

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Lockheed Martin's facility in Akron, OH has been in operation since 1929, when an airship manufacturing facility was constructed. Since that time, the business unit has supplied more than 8,000 lighter-than-air platforms; aircraft components; radar systems; flight simulation and training devices; torpedo warheads; underwater training targets; countermeasure dispensers; antisubmarine weapons and high-speed parallel computing processors. The facility has core businesses in Defense and Surveillance Systems, Simulation, Training & Support and Enterprise Information Systems. The core businesses are organized within market segments, including persistent surveillance systems, weapon systems, laser and sensor systems, as well as simulation and training systems.

in the news...

BEALE GLOBAL HAWK DEPLOYS FOR FIRST TIME

by 2nd Lt. Ashley Peltier
9th Reconnaissance Wing Public Affairs

BEALE AIR FORCE BASE, CA – The 9th Reconnaissance Wing's RQ-4 Global Hawk program passed a significant milestone by completing its first operational Global Hawk deployment July 19 from Beale Air Force Base to Andersen AFB, Guam. "This is the first time in United States Air Force history that we've deployed the Global Hawk aircraft, personnel and support equipment directly from Beale in support of a combatant commander tasking," said Lt. Col. Chad Clifton, the 9th Aircraft Maintenance Squadron commander. Previous Global Hawk deployments were flown out of Edwards AFB, Calif., with a combined effort from pilots of both Edwards and Beale Air Force bases. The flight also marks the first Global Hawk landing at Andersen AFB, where the Global Hawk is scheduled to be stationed permanently starting in 2009.

A flightline ground crew secures the Global Hawk for towing to a secure hangar July 19 at Andersen Air Force Base, Guam. The aircraft has a wing span of 116 feet and is designed to cruise at extremely high altitudes. This marked the first time a Global Hawk deployed in support from the 9th Reconnaissance Wing at Beale Air Force Base, Calif. (U.S. Air Force photo/Senior Airman Miranda Moorer)

The deployment symbolically represents the first step in stabilizing unmanned aircraft in national and international air space, base officials said. This operational mission required Beale AFB Airmen to set up the launch and recovery element, and all additional infrastructures to receive the aircraft at Andersen AFB. "We have stabilized our training operations at Beale and are now stepping out to show that we can safely self-deploy the Global Hawk around the world," said Lt. Col. J. Scott Winstead, the 12th Reconnaissance Squadron commander.

To make the long trip and land safely, many obstacles had to be overcome by maintenance and operations members. "The primary challenge from the operations side was software and weather," Colonel Winstead said. "We had to delay the initial deployment a week to allow a typhoon to move through the Guam area, and the software used to fly the Global Hawk is new and requires different training for the pilots." To overcome these obstacles, a massive training effort was launched by the 12th and 18th Reconnaissance Squadrons from Beale AFB. With the operations side addressed, maintenance professionals were facing their own equally demanding obstacles. Maintenance crews at Beale AFB had to focus on efficient trouble-shooting and problem correction to launch the aircraft in a 45-minute window. "We were dealing with so many firsts," said Maj. Alan Rabb, the 18th Reconnaissance Squadron chief of current operations and en route team commander. "Our first hurdle was to get (to Andersen) and get set up, which alone, proved to be a bit of a challenge." Once they arrived at Andersen AFB, the en route team of Beale AFB maintainers set up the launch and recovery element, initiating satellite connectivity, performing link checks and trouble-shooting possible risks; all necessary to receive the Global Hawk. "Maintenance leadership is extremely proud of every maintainer whose hard work and teamwork really made this operational mission happen," Colonel Clifton said. "Teamwork is truly the backbone of Global Hawk operations," Major Rabb said.

This mission demonstrated the tremendous range and capabilities the Global Hawk brings to the fight. "This deployment really shows the incredible global reach of the aircraft as the 16-hour leg from Beale to Guam was only slightly over half of the 30-hour capability," Colonel Winstead said. "The lessons learned here are critical to the future deployment capability of the Global Hawk," said Col. Jon Engle, the 9th Operations Group commander.

ESSEX DEMONSTRATES SUSTAINED MISSION READINESS

By Mass Communication Specialist 2nd Class (SW) Corey Truax, Commander, Amphibious Force, U.S. 7th Fleet, USS Essex Public Affairs

USS ESSEX, At Sea – The multi-purpose amphibious assault ship USS Essex (LHD 2) successfully completed a three-day evaluation, Unit Level Training Assessment-Sustainment (ULTRA-S) July 22, while returning from the U.S and Australian-led Exercise Talisman Saber 2007. A team of inspectors from the Afloat Training Group Western Pacific (ATGWP) arrived, via helicopter from Guam, to evaluate 16 mission areas including engineering, damage control, seamanship, combat systems, amphibious warfare, medical, aviation and force protection/anti-terrorism. ATGWP also reviewed Essex's Maintenance Material Management (3M) program to ensure that material readiness standards and maintenance practices continued to meet standards. "I am extremely proud of the hard work, exceptional performance and commitment to sustained excellence that our crew displayed during ULTRA-S," said Capt. Brian T. Donegan, Essex commanding officer. "Most importantly, I am pleased that Essex was able to achieve this level of performance by integrating realistic and challenging training into our daily routine." As part of the Forward Deployed Naval Forces, Essex is obligated to maintain peak operational readiness at all times, added Donegan.

ULTRA-S is designed to evaluate the ability of the ship's training team to effectively train the crew and then accurately assess the crew's proficiency in each mission area. The ship's training team is initially certified as capable of training the crew, without outside assistance, during an event called the Final Evaluation Problem (FEP). If the evaluations are within 10 percent of the highest markings, the ship is certified as not only able to provide basic training to the crew, but also as capable of sustaining mission readiness through continued training and accurate self assessment. "'Can we sustain the standards established at the Final Evaluation Problem certification over time?' Essex successfully demonstrated that fact," said Lt. Cmdr. Diane Quattrone, Essex training officer. "By conducting School of the Ship [classroom training] combined with drills six days a week, Essex was able to meet and exceed the standards established in the Surface Force Training Manual." Other training leaders agreed. "All the hard work and training paid off," stated Lt. Panjgonie, Essex ATG training liaison officer. "This is the first ship that ATG has seen that certified in all warfare areas demonstrated at ULTRA-S."

Essex Command Master Chief William T. Etherton felt

confident the crew was more than ready to impress ATGWP staff with their level of knowledge and ability to apply it in simulated and real life mission scenarios. "Our Sailors operate equipment and stand watch every day underway," said Etherton. "They are well trained, and qualified with the skillsets they need to respond to situations as they occur." Sailors aboard Essex echoed Etherton, stating for the most part that they were confident their training would carry them through the evaluation successfully and without any problem areas. "Our command training teams were being evaluated by ATG to ensure that they are correctly training the crew," said Hull Technician Chief (SW) David Forest. "We successfully finished FEP a few months ago and added new scenarios for the damage control teams. We trained as much as possible in a variety of areas like main space fires and damage to the ship."

In all areas, including 3M, Sailors were pushed to meet the highest standards. "This is just a look at where the ships training is and ensures that we are on track. For 3M we had several workcenters with perfect scores during reviews, spot checks and equipment validations," added Damage Controlman Chief (SW/AW) Mike Kelsey, Essex 3M coordinator.

Success during ULTRA-S is largely based on how accurately the ship's training team evaluates drills. ATGWP observes and evaluates the drills then debriefs with the training teams. "This is the first time that a ship was this successful in the evaluation process," stated Capt. Carl Carpenter, ATGWP commander, during the ULTRA-S outbrief.

With ULTRA-S successfully completed, Essex returned to Sasebo, Japan, for a period of maintenance, repairs and upgrades. Essex is the Navy's only forward-deployed amphibious assault ship and serves Task Force 76, the Navy's only forward-deployed amphibious force. Task Force 76 is headquartered at White Beach Naval Facility, Okinawa, Japan, with an operating detachment in Sasebo, Japan.

GATES URGES FASTER PRODUCTION OF MINE RESISTANT AMBUSH PROTECTED VEHICLES

By John J. Kruzel

WASHINGTON, June 29, 2007 - Defense Secretary Robert M. Gates said today he refuses to accept that improvised explosive devices are an uncontrollable challenge, and he urged private industry members today to produce Mine Resistant Ambush Protected vehicles, known as MRAPs, quickly and in greater numbers to counter this threat. "We absolutely are not accepting (IED attacks) as a challenge that can't be defeated," Gates said during a Pentagon news conference with Marine Gen. Peter Pace, chairman of the Joints Chiefs of Staff, at his side.

The secretary said he was briefed this week on how quickly MRAP vehicles, which have been proven effective in withstanding IED explosions, can be pushed into the field. "The need for them is greatest right now," he said.

Though they are not "fail-safe" against detonations, Gates said, he is particularly interested in the MRAP model that can safely guard against explosively formed projectiles — shaped charges designed to pierce armored vehicles. "These large IEDs can destroy an Abrams tank," he said. "So there is no sure-fire guarantee that anything will provide absolute protection against these. But I think the experience of the Marines in Anbar suggests that the MRAP, and particularly with the V-shaped hull, does provide significantly enhanced protection for the soldiers and Marines inside."

Gates estimated that it will take several months for a "significant flow" of MRAPs — many hundreds per month — to reach service members in combat. "The companies that have been awarded the contracts are ramping up their production capabilities," he said. "I am pressing them very hard to see where they can cut the time scale as well as increase their production." Currently, it takes 30 days to outfit MRAP vehicles with the necessary communications equipment and 30 more days to ship them by sea to troops in waiting, Gates said. "I basically said that I didn't think that was acceptable," said Gates, who told reporters that industry officials have cut down the amount of post-production time by about a week. "They are working hard to figure out how to cut it further," he said. "They are under great deal of pressure from me."

The Defense Department seeks to help accelerate MRAP production, Gates said, by helping manufacturers acquire specialty steels or axles, or break through other obstacles hindering rapid progress. To cut timelines for the much-needed vehicle, the secretary urged those involved in producing MRAPs to "look outside the normal bureaucratic way of doing things." For example, the Defense Department is flying some vehicles into the field, he said. "This is really not so much about industry having to change fundamentally the way they do business, it is simply finding ways to produce more of these vehicles faster," he said. "My effort is to try and incentivize people, both in this building and outside of this building, to see how fast they can ramp up the production, and I am confident that people are working hard on that and realize what the stakes are." "Lives are at stake," he said. "For every month we delay, scores of young Americans are going to die."

Also this week, Gates said retired Army Gen. Montgomery Meigs, head of the Joint Improvised Explosive Device Defeat Organization, briefed him on the U.S. military's progress in countering the bombing attacks. "We have found that what is very helpful in locating these IEDs is establishing personal relationships in the neighborhoods and in the areas, and where local inhabitants have looked to the coalition for support and for protection," he said.

Thanks to help from local residents in Iraq's Anbar province, Gates said, coalition forces have uncovered 70 percent of "implanted" IEDs. He said these figures are significantly higher than in areas where troops lack support from local citizens. Gates called coalition forces' discovery of IED caches, bomb-making materials and armaments, "one of the successes of the (troop) surge." But IEDs are beginning to appear in Afghanistan, he said. "This is not a problem, I think, that's going to be confined to Iraq, so I think we need to keep working on it and find ways to protect our soldiers and Marines," Gates said. IEDs are the enemies' weapon of choice, Pace said. "It is an asymmetric weapon, for sure," he said. "We are very precise in our application of combat power; they are random. They don't care who gets killed. "We're going after an entire network from where the ammunition comes from, through the leadership of the network, the delivery systems, the warehouses where they're made, how they're being implanted," Pace said. "There's been an enormous effort over the last couple of years, and it will continue to be a focused effort for us."

WSTIAC Training Courses:

DIRECTED ENERGY WEAPONS (DEW) COURSE

Instructor: Dr. Edward P. Scannell, Alion Science and Technology

Location: Huntsville, Alabama
2007 Course Offering: 30-31 Oct

COURSE DESCRIPTION:

This 2 day short course provides an introduction to the basic principles and techniques of Directed Energy Weapons (DEWs). Weapon system applications will also be thoroughly analyzed. The technologies behind each type of DEW will be examined, and the critical path components will be identified and explored with respect to their effect on future DEW development. In addition, advantages that can be achieved by employing DEWs will be discussed, as well as the status of DEW developments and deployments in the international arena. The key DEW programs in High Energy Lasers and RF-DEWs or High Power Microwaves will be fully described.

This short course is provided by the Weapon System Technology Information Analysis Center (WSTIAC). It will be of great benefit to people who need to understand the basic concepts, technologies, design requirements and practical applications of DEWs, including program and business managers, political decision makers, engineers, scientific researchers and military personnel. An undergraduate technical degree is recommended. Mathematics is kept to a minimum, but important formulas are introduced.

These and many other critical questions will be examined:

- What is Directed Energy and what are the different types of Directed Energy Weapons?
- What are the advantages and disadvantages of each type of DEW and what are their target effects and tactical and strategic capabilities?
- How do DEWs work and what are the critical technologies that must be developed for their eventual use in practical systems?
- How may threat DEW effects be countered and how can we protect our own systems?
- What are the major US and international DEW programs that are being pursued?
- What is the prognosis for future DEW development?

ABOUT THE INSTRUCTOR:

Dr. Edward Scannell is a senior member of Alion's technical staff and also serves as WSTIAC's Chief Scientist. Dr. Scannell was Chief of the Directed Energy and Power Generation Division of the US Army Research Laboratory. He has over 30 years of experience in technical areas related to DEWs, including: plasma physics, conventional and alternative energy sources, electromagnetic (EM) guns, particle beam, laser, high power microwave (HPM), and pulse power physics.

SECURITY CLASSIFICATION:

The course is UNCLASSIFIED, but is designated For Official Use Only (FOUO), Export Controlled and attendance is limited to US citizens only.

FEE:

The registration fee for this two day course is $950/student for US government personnel and government contractors. Method of payment is usually credit card (Master Card, VISA, or American Express), but 1556s or a MIPR can also be used.

HANDOUT MATERIAL:

Each student will receive a comprehensive set of course notes covering the material presented.

TRAINING LOCATION:

The course is taught at 6767 Old Madison Pike, Suite 95, Huntsville, AL 35806. WSTIAC can also conduct a dedicated course at your location to reduce your travel time and cost.

For additional information,
contact Mary Priore at 315.339.7135
or mpriore@alionscience.com

Notice: WSTIAC reserves the right to cancel and/or change the course schedule and/or instructor for any reason. In the event of a schedule change or cancellation, registered participants will be individually informed.

INTRODUCTION TO SENSORS AND SEEKERS COURSE

Instructor: Paul Kisatsky, Alion Science and Technology

Call for upcoming course dates or
to schedule a course at your location

COURSE DESCRIPTION:

This 3 day course provides an introduction to the most commonly used sensors and seekers employed in smart munitions and weapons (projectiles, missiles and wide area mines). It is oriented to managers, engineers, and scientists who are engaged in smart weapons program development and who desire to obtain a deeper understanding of the sensors they must deal with, but who do not need to personally design or analyze them in depth. An undergraduate technical degree is recommended. Mathematics is kept to a minimum, but important formulas are introduced. This course also provides an excellent foundation for those scientists and engineers who desire to pursue this discipline to intermediate and advanced levels.

The course covers:

- Classification of seekers and sensors
- Fundamentals of waves and propagation
- Fundamentals of noise and clutter
- Fundamentals of search footprints
- Introduction to infrared
- Introduction to radar
- Introduction to ladar
- Introduction to visionics
- Introduction to acoustics
- Future projections and interactive brainstorming

Noise and clutter, the predominant obstacles to success in autonomous seekers, are given emphasis. The major sensor types are classified and each is discussed. In particular, infrared, radar, optical laser radar (ladar), imaging and non-imaging, and acoustic sensors are individually covered. Of special interest is the discussion on human visionics versus machine recognition, since this concept is of central importance to understanding autonomous versus man-in-the-loop sensing systems. The implications of "artificial intelligence", "data fusion", and "multi-mode" sensors are also briefly discussed. System constraints, which force trade-offs in sensor design and in ultimate performance, are also covered. Time permitting, a projection of future trends in the role of sensors for smart munitions will be presented, followed by a "brain-storming" session to solicit student views.

ABOUT THE INSTRUCTOR:

Paul Kisatsky is a Senior Advisory Scientist with Alion Science and Technology. He is a nationally recognized Subject Matter Expert on sensors and seekers for smart munitions and weapons, and he has more than 40 years of experience in sensors and seekers analysis of modern smart weapons.

SECURITY CLASSIFICATION:

This course is UNCLASSIFIED, but is designated Export Controlled and attendance is limited to US citizens only.

FEE:

The registration fee for this 3 day course is $950/ student for US government personnel and government contractors. Method of payment is usually credit card (Master Card, VISA, or American Express), but 1556s or a MIPR can be used.

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SMART/PRECISION WEAPONS COURSE

Instructor: Mr. Bob Fitzgibbon
Alion Science and Technology

Location: Huntsville, Alabama
2007 Course Offering: 13-15 Nov
(Course starts at 0800 Tuesday and ends at noon on Thursday)

COURSE DESCRIPTION:

This 2 1/2 day short course provides a general understanding of smart weapons and related technologies. This course is aimed at providing general knowledge about smart weapons technology and a source of current information on selected US and foreign smart weapons, to include system description, concept of employment, performance characteristics, effectiveness and program status.

A variety of ground, sea and air smart/precision weapon systems are discussed, to include fielded and/or developmental US systems such as Joint Direct Attack Munition (JDAM), Joint Standoff Weapon (JSOW), Joint Air-to-Surface Standoff Missile (JASSM), Advanced Medium Range Air To Air Missile (AMRAAM), Javelin, Excalibur, Precision Guided Mortar Munition (PGMM), High Speed Anti-Radiation Missile (HARM), Tomahawk, Standoff Land Attack Missile – Expanded Response (SLAM-ER), Small Diameter Bomb (SDB), Cluster Bomb Munitions and Non Line of Sight – Launch Systems, among others, as well as representative foreign smart/precision weapons.

The objective of this course is to inform materiel and combat developers, systems analysts, scientists, engineers, managers and business developers about smart/precision weapons, to include:

- State of the art of representative US and foreign smart weapons systems;
- Employment concepts;
- Smart weapons related systems, subsystems, and technologies; and
- Technology trends.

ABOUT THE INSTRUCTOR:

Mr. Bob Fitzgibbon is a Science Advisor with Alion and he has 27 years in system analysis and design. He has actively worked ECM, RF and RWR programs as well as hardware modernization efforts.

SECURITY CLASSIFICATION:

The course is UNCLASSIFIED, but is designated For Official Use Only (FOUO), Export Controlled and attendance is limited to US citizens only.

FEE:

The registration fee for this 2 1/2 day course is $950/student for US government personnel and government contractors. Method of payment is usually credit card (Master Card, VISA, or American Express), but 1556s or a MIPR can be used.

HANDOUT MATERIAL:

Each student will receive a comprehensive set of course notes covering the material presented.

TRAINING LOCATION:

The course is taught at 6767 Old Madison Pike, Suite 95, Huntsville, AL 35806. WSTIAC can also conduct a dedicated course at your location to reduce your travel time and cost.

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SYSTEMS ENGINEERING FOR PRODUCT LIFE CYCLE MANAGEMENT

Instructor: Mr. David F. Tyler, Advanced Automation Corporation

Location: TBA
2007 Course Offerings: TBD
Onsite Option Available

COURSE DESCRIPTION:

Due to the increase in the need for systems engineering and sustainment professionals WSTIAC offers a professional certificate program in the systems engineering and life cycle sustainment fields. The program consists of six courses that are focused on different aspects of these disciplines. In order to get the certificate a student must complete three of the six courses.

The courses include state-of-the-art techniques combined with how they apply to current directives from the US DoD and NATO. They are taught by seasoned professionals with significant backgrounds in their respective disciplines.

This intensive 3-day course is the first in the certificate series and provides a comprehensive overview of the discipline of Systems Engineering and how it is applied over the life cycle of a product. Systems engineering is the integration of several engineering fields into an efficient and effective process for the overall technical management of programs and development of systems and equipment which meet user requirements. The field has been evolving and new systems engineering frameworks and definitions are presented.

Topics include Systems Engineering standards, models, technical management, analysis and evaluation, product realization, product control, configuration and data management, product support, coupled with a practical approach to capability maturity. Specialty Engineering disciplines such as manufacturing, logistics, environment, human factors, are reviewed and integrated into the Systems Engineering process with several case study examples from industry and government.

ABOUT THE INSTRUCTOR:

Mr. David F. Tyler is a Senior Level Acquisition and Systems Engineering expert. He has more than 30 years in the field across a wide range of DoD, DoE, NASA and commercial programs. He has developed system engineering plans for a wide variety of government and commercial organizations. Mr. Tyler has written over 50 papers on these and related topics. Mr. Tyler is a member of the Logistics management Community at DAU.

SECURITY CLASSIFICATION:

The course is UNCLASSIFIED.

FEE:

The registration fee is $1,295 for this three day course for US Government personnel or contractors. Method of payment is usually credit card (MasterCard, Visa or American Express), but 1556s or a MIPR can also be used.

HANDOUT MATERIAL:

Each student will receive a comprehensive set of course material and a reference CD.

TRAINING LOCATION:

Custom onsite training option available.
Open course dates and location TBD.

For additional information,
contact Mary Priore at 315.339.7135
or mpriore@alionscience.com

Courses include:
Systems Engineering for Product Life Cycle Management
Specialty Engineering for Product Life Cycle Management
Maintenance Engineering for Product Life Cycle Management
Performance-Based Logistics (PBL) for Operational Management
Supply Chain Design & Logistics Operational Management
Enterprise Capability Maturity Model (CMMi) Implementation Course

calendar of events

Upcoming Conferences and Courses

October 2007

Maritime Reconnaissance & Surveillance 2007
8-9 October 2007
Lisbon, Portugal
For additional information:
http://www.iqpc.com/eu/maritime/ediary

AIAA 5th Biennial National Forum on Weapon System Effectiveness
16-18 October 2007
Huntsville, AL
For additional information:
http://www.aiaa.org/content.cfm?pageid=230&lumeetingid=1803

10th Annual Systems Engineering Conference
22-25 October 2007
San Diego, CA
For additional information:
http://www.ndia.org/Template.cfm?Section=8870

NATO/EU Partner Nations Air Systems Requirements Conference
24-25 October 2007
Riga, Latvia
For additional information:
http://www.defenceiq.com/uk/nasr/ediary

2007 Combatant Commanders Workshop
29-30 October 2007
Suffolk, VA
For additional information:
https://www.enstg.com/Invitation

Directed Energy Weapons Course
30-31 October 2007
Huntsville, AL
For additional information:
http://wstiac.alionscience.com/wstiac/training.do

November 2007

IMAPS 2007
11-15 November 2007
San Jose, CA
For additional information:
http://www.imaps.org/imaps2007/index.htm

Smart/Precision Weapons Course
13-15 November 2007
Huntsville, AL
For additional information:
http://wstiac.alionscience.com/wstiac/training.do

DoD Maintenance Symposium & Exhibition
13-16 November 2007
Orlando, FL
For additional information:
http://www.sae.org/events/dod/

6th Annual Light Armored Vehicles and Stryker Summit
13-15 November 2007
Arlington, VA
For additional information:
http://www.lightarmoredvehiclessummit.com/

154th Meeting of the Acoustical Society of America
27 November – 1 December 2007
New Orleans, LA
For additional information:
http://asa.aip.org/meetings.html

January 2008

54rd Annual Reliability & Maintainability Symposium (RAMS)
28-31 January 2008
Las Vegas, NV
For additional information:
http://www.rams.org/

Register Now for the 2007 Combatant Commanders Workshop

"Rapid Technical Support for the Warfighter"

Hosted By:	**The Honorable John J. Young, Jr., Acting Under Secretary, Acquisition, Technology and Logistics (AT&L) and Mr. R. Paul Ryan, Administrator, of the DoD's Defense Technical Information Center (DTIC)**
	Located at the "Lighthouse," Center for Innovation 8000 Harbour View Boulevard Suffolk, VA 23435
Dates:	**Monday, 29 October 2007 - Tuesday, 30 October 2007**
Purpose:	**To improve CoCOM awareness of technology information, and align force providers technical information needs with the Defense Technical Information Center's (DTIC) tools, Research and Engineering (R&E) Portal, Information Analysis Centers (IACs), and Scientific and Technical Information Network (STINET).**
Target Audience:	**Military Officers 0-5 and above. Civilians GS-14 and above.**

Additional Workshop details and registration information are available at: https://www.enstg.com/Invitation. Enter Code: 20069924.

Questions, issues, suggestions?
Please email the workshop coordinator at: DTICCoComWorkshop@dtic.mil.

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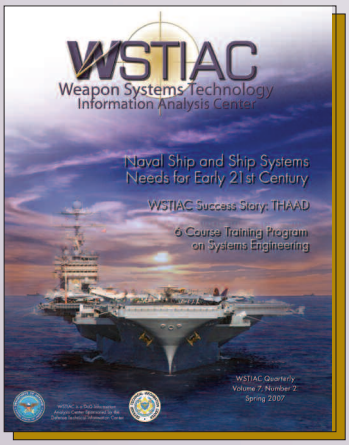

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